

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

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SUISSE

26. AUG. 2005					
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## PCT

### NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Rule 71.1)

Date of mailing  
(day/month/year)

24.08.2005

Applicant's or agent's file reference  
08020PC

#### IMPORTANT NOTIFICATION

International application No.  
PCT/IB 03/02541

International filing date (day/month/year)  
06.06.2003

Priority date (day/month/year)  
06.06.2003

Applicant  
ZEOCHEM AG et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

#### 4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed inventions is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the international  
preliminary examining authority:



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# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>08020PC</b>	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. <b>PCT/IB 03/02541</b>	International filing date (day/month/year) <b>06.06.2003</b>	Priority date (day/month/year) <b>06.06.2003</b>
International Patent Classification (IPC) or both national classification and IPC <b>B01J20/18</b>		
Applicant <b>ZEOCHEM AG et al.</b>		
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 7 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 1 sheets.</p>		
<p>3. This report contains indications relating to the following items:</p> <p>I <input checked="" type="checkbox"/> Basis of the opinion</p> <p>II <input type="checkbox"/> Priority</p> <p>III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p>IV <input checked="" type="checkbox"/> Lack of unity of invention</p> <p>V <input checked="" type="checkbox"/> Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p>VI <input type="checkbox"/> Certain documents cited</p> <p>VII <input type="checkbox"/> Certain defects in the international application</p> <p>VIII <input type="checkbox"/> Certain observations on the international application</p>		
Date of submission of the demand  <b>09.12.2004</b>	Date of completion of this report  <b>24.08.2005</b>	
Name and mailing address of the international preliminary examining authority:   <b>European Patent Office</b> <b>D-80298 Munich</b> <b>Tel. +49 89 2399 - 0 Tx: 523656 epmu d</b> <b>Fax: +49 89 2399 - 4465</b>	Authorized Officer  <b>Van Iddekinge, R</b>  Telephone No. <b>+49 89 2399-8346</b> 	

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IP16 Rec'd PCT 06 DEC 2005

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/IB 03/02541

**I. Basis of the report**

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, Pages**

1-15 as originally filed

**Claims, Numbers**

1-16 as originally filed

17-24 received on 18.02.2005 with letter of 16.02.2005

**Drawings, Sheets**

1-4 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. **PCT/IB 03/02541**

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**IV. Lack of unity of invention**

1. In response to the invitation to restrict or pay additional fees, the applicant has:

- ☒ restricted the claims.  
☐ paid additional fees.  
☐ paid additional fees under protest.  
☐ neither restricted nor paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

- ☐ complied with.  
☒ not complied with for the following reasons:

**see separate sheet**

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

- ☒ all parts.  
☐ the parts relating to claims Nos. .

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes: Claims	5-9,14-24
	No: Claims	1-4,10-13
Inventive step (IS)	Yes: Claims	14-24
	No: Claims	1-13
Industrial applicability (IA)	Yes: Claims	1-24
	No: Claims	

2. Citations and explanations

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/B 03/02541

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**see separate sheet**

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AP16 REGISTRATION 06 DEC 2005

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/IB 03/02541

**Re Item IV**

**Lack of unity of invention**

1). Reference is made to the following documents:

D1=EP-A-503876  
D2=EP-A-403141  
D3=EP-A-541101  
D4=US-A-5110776  
D5=SU-A-127446  
D6=WO-A-00/71249  
D7=EP-A-511885  
D8=US-A-5057473  
D9=US-A-6103949  
D10=US-A-4404118  
D11=US-A-4098684

2). This Authority considers that there are two inventions covered by the claims indicated as follows:

- I: Claims 1-13 directed to a process to produce a phosphate treated zeolite and its product
- II: Claims 14-24 directed to processes for adsorbing and desorbing organic sulfur compounds with a phosphate treated zeolite

The reasons for which the inventions are not so linked as to form a single general inventive concept, as required by Rule 13.1 PCT, are as follows:

The common concept linking together the independent claims (1,13), (14) and (17,18,21) is the following:

A phosphate treated faujasite according to claim 13

This common concept is not novel, see documents D1, D2, D3, D4 and D9 (explained in point 3 below).

The application, hence does not meet the requirements of unity of invention as

defined in Rules 13.1 and 13.2 PCT.

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement**

- 3). D1, D3, D4 and D9 disclose a process to produce a formed faujasite according to claim 1 and the resulting phosphate treated faujasite according to claim 13, see D1: claims 1,2,7,9,11,12; examples 1-6,12 and D3: claims 1,2; page 3, lines 16-35, 43-46; page 4, lines 8-1 and D4: claims 1,3,4,9,11; examples 1-6,12 0 and D9: claim 1; column 7, lines 23-25.

Furthermore D2 disclose a phosphate treated faujasite according to claim 13, see D2: claims 1,3-5; page 5, lines 3-24; example 3 and D3: claims 1,3,4,9,11; examples 1-6,12 and D4: claims 1,2; page 3, lines 16-35, 43-46; page 4, lines 8-10 and D9: claim 1; column 7, lines 23-25. Contrary to what the applicant has written (letter dated 1.07.2005) D2 clearly discloses a composition comprising a faujasite zeolite (USY zeolite), an inorganic phosphate salt ( $\text{Mg}_3(\text{PO}_4)_2$ ) and a binder (clay) that has been calcined, see D2: example 3.

It is to be noted that a product is not rendered novel merely by the fact that it is produced by means of a new process.

The additional features of dependent claims 2 - 4, 10 - 12 are also known from D1, D2, D3, D4 and/or D9.

Therefore claims 1 and its dependent claims 2 - 4, 10 - 12 do not fulfil the requirements of Article 33(2) PCT (novelty).

According to the applicant (letter dated 1.07.2005) D1, D2, D3, D4 and D9 are not novelty destroying to claim 13, because these documents disclose catalysts and not zeolitic adsorption compounds as required by claim 13. The catalysts of D1, D2, D3, D4 and D9 are also capable of absorbing, in fact during their use they will absorb the reactants. Thus this is not a distinguishing feature.

The argument of the applicant that the catalysts of D1 are not calcined, is simply not true, see D1: Table I; page 11, lines 39, 55; page 12, line 19.

The additional features of dependent claims 5 - 9 do not appear, in combination with the features of any claim to which they refer, to involve an inventive step.

Therefore dependent claims 5 - 9 of the application do not fulfil the requirements of Article 33(3) PCT (inventive step).

- 4). D5, D6, D7, D8, D10 and D11 disclose that adsorbing low molecular weight sulfur compounds from a gaseous or liquid stream by means of a faujasite molecular sieve, see: D5: abstract and D6: claims 1,10,21; page 19, lines 14-21 and D7: example 3 and D8: column 9, lines 30-61 and D10: example 4; column 5, lines 53-68 and D11: column 4, lines 40-63; claims 1,4.

None of these documents D5, D6, D7, D8, D10 and D11 disclose phosphor treated faujasite molecular sieves.

Therefore claims 14 to 27 fulfil the requirements of Article 33(2) PCT (novelty).

Since the comparative examples show that phosphor treated faujasite molecular sieves have an improved desorption curve for ethyl mercaptan, the subject-matter of claims 14-27 involves an inventive step (Article 33(3) PCT ), see figures 2,3.



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17. A desorption process for the desorption of organic sulfur compounds from a zeolitic adsorption compound of claim 13, wherein the desorption is done by a heating profile allowing the organic sulfur compounds to reach their equilibrium adsorption capacity at each temperature.

18. A desorption process, in particular according to claim 17, for the desorption of organic sulfur compounds from a zeolitic adsorption compound of claim 13, wherein the desorption is done by fast heating to a basic temperature of at most 200°C, preferably 100 to 150°C, in particular about 150°C, and then using a temperature halt at different temperature levels starting at the basic temperature.

19. A process according to claim 18, wherein the halt time is at least 10 minutes at each temperature level.

20. A process according to claim 18 or 19, wherein the temperature levels are at least 5°C and at most 50°C apart from each other.

21. A desorption process, in particular according to claim 17, of organic sulfur compounds from a zeolitic adsorption compound of claim 13, wherein the desorption is done by fast heating to a basic temperature of at most 200°C, preferably 100 to 150°C, in particular about 150°C, and then heating using a small temperature increase rate at temperature levels above the basic temperature.

22. A process of claim 21, wherein the temperature increase rate is less than 3°C/min.

23. The process of anyone of claims 17 to 22, wherein the maximum regeneration temperature is about 320°C.

24. The process of anyone of claims 17 to 23, wherein the regeneration gas is a dry natural gas, methane, natural gas liquids, hydrogen, nitrogen or hydrocarbons.